ARTICLE S47

**Operator's Certificates**

**Section II. Categories of Operator's Certificates**

NOC **S47.19**

NOC **S47.23**

NOC **S47.24**

NOC TABLE S47-1

**Requirements for Radio Electronic and Operator's Certificates**

ARTICLE S48

**Personnel**

NOC **S48.5**

NOC **S48.6**

MOD **S48.7** § 5. The personnel of ship stations and ship earth stations for which a radio installation is not compulsory either under international agreements or national regulations and which use the frequencies and techniques prescribed in Chapter **SVII** shall be adequately qualified and certificated in accordance with the administration's requirements. Guidance concerning appropriate qualifications and certification is provided in Resolution **COM4-4**. This Resolution describes two appropriate certificates for use by personnel of ship stations and ship earth stations for which a radio installation is not compulsory.

ARTICLE S51

**Conditions to Be Observed in the Maritime Services**

**Section I. Maritime Mobile Service**

*D. Ship Stations Using Radiotelephony*

**MOD** **S51.53** *a)* send class J3E emissions on a carrier frequency of 2 182 kHz and receive class J3E emissions on a carrier frequency of 2 182 kHz, except for such apparatus as is referred to in No. **S51.56** (see also Appendix **S13**);

ARTICLE S52

**MOD** **S52.3** (2) Where these provisions specify class F1B emission, classes J2B and J2D emission shall be considered equivalent. However, class J2D emission shall not be used with the HF distress and safety frequencies listed in Appendix **S15**.

**MOD** **S52.7** (2) From 1 February 1999, in the maritime mobile service, the frequency 490 kHz is used exclusively for the transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of narrow-band direct-printing telegraphy.

**MOD** **S52.54** § 19. (1) Ship Morse radiotelegraph stations equipped to operate in the bands specified in Appendix **S17**, Part B, Sections IV and V, shall employ the classes of emission mentioned in No. **S52.2** for Morse telegraphy at speeds not exceeding 40 bauds. Survival craft stations may use class A2A or H2A emissions in these bands (see Appendix **S13**)[6].

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**ADD** **S52.54.1** [6] Additionally, use of classes J2B and J2D emissions are permitted on a non-interference basis to A1A Morse operations. However, these emissions shall not be used on the HF safety and distress frequencies listed in Appendix **S15**.

**MOD** **S52.55** (2) Except as provided for in Nos. **S52.222.1** and **S52.54.1**, coast Morse radiotelegraph stations operating in the bands exclusively allocated to the maritime mobile service between 4 000 kHz and 27 500 kHz shall not use Type 2 emissions (see No. **S52.18**).

**MOD S52.189** § 87. (1) The frequency 2 182 kHz[1] is an international distress frequency for radiotelephony (see Appendix **S13** for details of its use for distress, urgency, safety and emergency position-indicating radiobeacon (EPIRB) purposes).

**NOC S52.189.1**

**MOD S52.217** § 96. (1) The class of emission to be used for analogue radiotelephony in the bands between 4 000 and 27 500 kHz shall be J3E; for digital telecommunications in those bands, the class of emission shall be J2D.

**MOD S52.219** (3) Coast stations employing class J3E or J2D emissions in accordance with No. **S52.217** in the bands between 4 000 and 27 500 kHz shall use the minimum power necessary to cover their service area and shall at no time use a peak envelope power in excess of 10 kW per channel.

**MOD S52.220** (4) Ship stations employing class J3E or J2D emissions in accordance with No. **S52.217** in the bands between 4 000 and 27 500 kHz shall at no time use a peak envelope power in excess of 1.5 kW per channel.

ARTICLE S53

**Order of Priority of Communications**

**MOD S53.1** All stations in the maritime mobile service and the maritime mobile-satellite service shall be capable of offering four levels of priority in the following order:

1. Distress calls, distress messages, and distress traffic.
2. Urgency communications.
3. Safety communications.
4. Other communications.

**SUP S53.1.1**

**SUP S53.1.2**

**ADD S53.1A** In a fully automated system, where it is impracticable to offer all four levels of priority, category 1 shall receive priority until such time as intergovernmental agreements[1] remove exemptions granted for such systems from offering the complete order of priority.

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**ADD S53.1A.1** [1] Requirements and performance standards for radio systems and equipment for maritime distress and safety radiocommunications are developed and adopted by the International Maritime Organization.

ARTICLE S59

**Provisional Application of the Radio Regulations**

**MOD** **S59.1** These Regulations, which complement the provisions of the Constitution and Convention of the International Telecommunication Union (Geneva, 1992), and as revised and contained in the Final Acts of the World Radiocommunication Conferences (Geneva, 1995 and Geneva, 1997) shall have provisional application, pursuant to Article 54 of the Constitution, on the following basis.

**MOD** **S59.2** The provisions of these Regulations, as revised by the World Radiocommunication Conference (Geneva, 1995), concerning new or modified frequency allocations (including any new or modified conditions applying to existing allocations) and the related provisions of **S21**, **S22** and Appendix **S4**, apply provisionally as of 1 January 1997.

**ADD** **S59.3** The other provisions of these Regulations, as revised by the World Radiocommunication Conferences (Geneva, 1995 and 1997), shall apply provisionally as of 1 January 1999, with the following exceptions:

**ADD** **S59.4**

– the revised provisions for which other effective dates of application are stipulated in Resolutions **PLEN-4, PLEN-5, GTPLEN2-1, COM4-18, COM4-19, COM5-18, COM5-19** and **COM5-30***.

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* To be reviewed and completed.

# PART II

Appendices
to
the Radio
Regulations

MOD

APPENDIX S3

## Table of Maximum Permitted Spurious Emission Power Levels

(See Article S3)

1. The following sections indicate the maximum permitted levels of spurious emissions, in terms of power as indicated in the tables, of any spurious component supplied by a transmitter to the antenna transmission line. Section 1 is applicable until 1 January 2012 to transmitters installed on or before 1 January 2003; Section 2 is applicable to transmitters installed after 1 January 2003 and to all transmitters after 1 January 2012. This Appendix does not cover out-of-band emissions. Out-of-band emissions are dealt with in No. S4.5 of the Radio Regulations.

2. Spurious emission from any part of the installation, other than the antenna and its transmission line, shall not have an effect greater than would occur if this antenna system were supplied with the maximum permitted power at that spurious emission frequency.

3. These levels shall not, however, apply to emergency position-indicating radiobeacon (EPIRB) stations, emergency locator transmitters, ships' emergency transmitters, lifeboat transmitters, survival craft stations or maritime transmitters when used in emergency situations.

4. For technical or operational reasons, more stringent levels than those specified may be applied to protect specific services in certain frequency bands. The levels applied to protect these services, such as safety and passive services, shall be those agreed upon by the appropriate world radiocommunication conference. More stringent levels may also be fixed by specific agreement between the administrations concerned. Additionally, special consideration of transmitter spurious emissions may be required for the protection of safety services, radio astronomy and space services using passive sensors. Information on the levels of interference detrimental to radio astronomy, earth exploration satellites and meteorological passive sensing is given in the most recent version of Recommendation ITU-R SM.329.

5. Spurious emission limits for combined radiocommunication and information technology equipment are those for the radiocommunication transmitters.

### Section I. Spurious Emission Limits for Transmitters Installed on or Before 1 January 2003 (valid until 1 January 2012)

6. The measurement methods for radar systems should be guided by Recommendation ITU-R M.1177. For those radar systems for which acceptable methods of measurement do not exist, the lowest practicable power of spurious emission should be achieved.

TABLE I

**Attenuation values and absolute mean power levels used to calculate maximum permitted spurious emission power levels for use with radio equipment**

| Frequency Band Containing the Assignment<br>(lower limit exclusive, upper limit inclusive) | For any spurious component the attenuation (mean power within the necessary bandwidth relative to the mean power of the spurious component concerned) shall be at least that specified below and the absolute mean power levels given shall not be exceeded (Note 1) |
|---|---|
| **9 kHz to 30 MHz** | 40 decibels<br>50 milliwatts<br>(Notes 2, 3 and 4) |
| **30 MHz to 235 MHz** | |
| - mean power above 25 watts | 60 decibels<br>1 milliwatts<br>(Note 5) |
| - mean power 25 watts or less | 40 decibels<br>25 microwatts |
| **235 MHz to 960 MHz** | |
| - mean power above 25 watts | 60 decibels<br>20 milliwatts<br>(Notes 6 and 7) |
| - mean power 25 watts or less | 40 decibels<br>25 microwatts<br>(Notes 6, 7) |
| **960 MHz to 17.7 GHz** | |
| - mean power above 10 watts | 50 decibels<br>100 milliwatts<br>(Notes 6, 7, 8 and 9) |
| - mean power 10 watts or less | 100 microwatts<br>(Notes 6, 7, 8 and 9) |
| **Above 17.7 GHz** | The lowest possible values achievable shall be employed (see Recommendation **66 (Rev.WRC-97)**). |

**Notes in Table I**

[1] When checking compliance with the provisions of the table, it shall be verified that the bandwidth of the measuring equipment is sufficiently wide to accept all significant components of the spurious emission concerned.

[2] For mobile transmitters which operate below 30 MHz any spurious component shall have an attenuation of at least 40 decibels without exceeding the value of 200 milliwatts, but every effort should be made to comply with the level of 50 milliwatts wherever practicable.

[3] For transmitters of a mean power exceeding 50 kilowatts which can operate on two or more frequencies covering a frequency range approaching an octave or more, while a reduction below 50 milliwatts is not mandatory, a minimum attenuation of 60 decibels shall be provided.

[4] For hand-portable equipment of mean power less than 5 watts, the attenuation shall be 30 decibels, but every practicable effort should be made to attain 40 decibels attenuation.

[5] Administrations may adopt a level of 10 milliwatts provided that harmful interference is not caused.

[6] Where several transmitters feed a common antenna or closely spaced antennae on neighbouring frequencies, every practicable effort should be made to comply with the levels specified.

[7] Since these levels may not provide adequate protection for receiving stations in the radio astronomy and space services, more stringent levels might be considered in each individual case in the light of the geographical position of the stations concerned.

[8] These levels are not applicable to systems using digital modulation techniques, but may be used as a guide. Values for these systems may be provided by the relevant ITU-R Recommendations, when available (see Recommendation **66 (Rev.WRC-97)**).

[9] These levels are not applicable to stations in the space services, but the levels of their spurious emissions should be reduced to the lowest possible values compatible with the technical and economic constraints to which the equipment is subject. Values for these systems may be provided by the relevant ITU-R Recommendations, when available (see Recommendation **66 (Rev.WRC-97)**).

ADD

## Section II. Spurious Emission Limits for Transmitters Installed After 1 January 2003 and for All Transmitters After 1 January 2012

*Application of these Limits*

7. The frequency range of the measurement of spurious emissions is from 9 kHz to 110 GHz or the second harmonic if higher.

8. Guidance regarding the methods of measuring spurious emissions is given in the most recent version of Recommendation ITU-R SM.329. The e.i.r.p. method specified in that Recommendation should be used when it is not possible to measure the power supplied to the antenna transmission line. Additionally, the e.i.r.p. method may need some modification for special cases, e.g. beam-forming radars.

9. Guidance regarding the methods of measuring spurious emissions from radar systems is given in the most recent version of Recommendation ITU-R M.1177. The reference bandwidths required for proper measurement of radar spurious emissions should be calculated for each particular radar system. Thus, for the three general types of radar pulse modulation utilized for radionavigation, radiolocation, acquisition, tracking and other radiodetermination functions, the reference bandwidth values should be:

- for fixed-frequency, non-pulse-coded radar, one divided by the radar pulse length, in seconds (e.g. if the radar pulse length is 1 microsecond, then the reference bandwidth is $1/1\mu s = 1$ MHz);
- for fixed-frequency, phase coded pulsed radar, one divided by the phase chip length, in seconds (e.g. if the phase coded chip is 2 microseconds long, then the reference bandwidth is $1/2\mu s = 500$ kHz);
- for frequency modulated (FM) or chirped radar, the square root of the quantity obtained by dividing the radar bandwidth in MHz by the pulse length, in seconds (e.g. if the FM is from 1 250 to 1 280 MHz or 30 MHz during the pulse of 10 microseconds, then the reference bandwidth is $(30 \text{ MHz}/10\mu s)^{1/2} = 1.73$ MHz).

For those radar systems for which acceptable methods of measurement do not exist, the lowest practicable power of spurious emission should be achieved.

10. The spurious emission levels are specified in the following reference bandwidths:

- 1 kHz between 9 and 150 kHz
- 10 kHz between 150 kHz and 30 MHz
- 100 kHz between 30 MHz and 1 GHz
- 1 MHz above 1 GHz

As a special case, the reference bandwidth of all space service spurious emissions should be 4 kHz.

11. For the purpose of setting limits, all emissions, including harmonic emissions, intermodulation products, frequency conversion products and parasitic emissions, which fall at frequencies separated from the centre frequency of the emission by ±250%, or more, of the necessary bandwidth of the emission will generally be considered as spurious emissions. However, this frequency separation may be dependent on the type of modulation used, the maximum bit rate in the case of digital modulation, the type of transmitter and frequency coordination factors. For example, in the case of digital (including digital broadcasting) modulation systems, broadband systems, pulsed modulation systems and narrow-band high power transmitters, the frequency separation may need to differ from the ±250% factor. For multichannel or multicarrier transmitters/transponders, where several carriers may be transmitted simultaneously from a final output amplifier or an active antenna, the centre frequency of the emission is taken to be the centre of the -3 dB bandwidth of the transmitter or transponder and the necessary bandwidth is taken to be the transmitter or transponder bandwidth.

12. Examples of applying 43 + 10log(P) to calculate attenuation requirements

Where specified in relation to mean power, spurious emissions are to be at least x dB below the total mean power P, i.e. -x dBc. The power P (in watts) is to be measured in a bandwidth wide enough to include the total mean power. The spurious emissions are to be measured in the reference bandwidths given in the Recommendation. The measurement of the spurious emission power is independent of the value of necessary bandwidth. Because the absolute emission power limit, derived from 43 + 10log(P), can become too stringent for high power transmitters, alternative relative powers are also provided in Table II.

**Example 1**

A land mobile transmitter, with any value of necessary bandwidth, must meet a spurious emission attenuation of 43 + 10log(P), or 70 dBc, whichever is less stringent. To measure spurious emissions in the frequency range between 30 and 1 000 MHz, Recommendation ITU-R SM.329-7 *recommends* 4.1 indicates the use of a reference bandwidth of 100 kHz. For other frequency ranges, the measurement must use the appropriate reference bandwidths given in *recommends* 4.1.

With a measured total mean power of 10 watts:

- Attenuation relative to total mean power = 43 + 10log(10) = 53 dBc.
- The 53 dBc is less stringent than 70 dBc, so the 53 dBc value is used.
- Therefore: Spurious emissions must not exceed 53 dBc in a 100 kHz bandwidth, or converting to an absolute level, spurious emissions must not exceed 10 dBW - 53 dBc = -43 dBW in a 100 kHz reference bandwidth.

With a measured total mean power of 1 000 watts:

- Attenuation relative to total mean power = 43 + 10log(1 000) = 73 dBc.
- The 73 dBc is more stringent than 70 dBc limit, so the 70 dBc value is used.
- Therefore: Spurious emissions must not exceed 70 dBc in a 100 kHz bandwidth, or converting to an absolute level, spurious emissions must not exceed 30 dBW - 70 dBc = -40 dBW in a 100 kHz reference bandwidth.

**Example 2**

A space service transmitter with any value of necessary bandwidth, must meet a spurious emission attenuation of 43 + 10log(P), or 60 dBc, whichever is less stringent. To measure spurious emissions at any frequency, Note 1 of Table II indicates using a reference bandwidth of 4 kHz.

With a measured total mean power of 20 watts:

- Attenuation relative to total mean power = 43 + 10log(20) = 56 dBc.
- The 56 dBc is less stringent than the 60 dBc limit, so the 56 dBc value is used.
- Therefore: Spurious emissions must not exceed 56 dBc in a 4 kHz reference bandwidth, or converting to an absolute level, spurious emissions must not exceed 13 dBW - 56 dBc = -43 dBW in a 4 kHz reference bandwidth.

TABLE II

**Attenuation values used to calculate maximum permitted spurious emission power levels for use with radio equipment**

| Service category in accordance with Article **S1**, or equipment type (Note 15) | Attenuation (dB) below the power supplied to the antenna transmission line |
|---|---|
| All services except those services quoted below: | 43 + 10 log(P), or 70 dBc, whichever is less stringent |
| Space services (earth stations) (Notes 10 and 14) | 43 + 10 log(P), or 60 dBc, whichever is less stringent |
| Space services (space stations) (Notes 10 and 14) | 43 + 10 log(P), or 60 dBc, whichever is less stringent |
| Radiodetermination | 43 + 10 log(PEP), or 60 dB, whichever is less stringent |
| Broadcast television (Note 11) | 46 + 10 log(P), or 60 dBc, whichever is less stringent, without exceeding the absolute mean power level of 1 mW for VHF stations or 12 mW for UHF stations. However, greater attenuation may be necessary on a case by case basis. |
| Broadcast FM | 46 + 10 log(P), or 70 dBc, whichever is less stringent; the absolute mean power level of 1 mW should not be exceeded |
| Broadcasting at MF/HF | 50 dBc; the absolute mean power level of 50 mW should not be exceeded |
| SSB from mobile stations (Note 12) | 43 dB below PEP |
| Amateur services operating below 30 MHz (including with SSB) (Note 12) | 43 + 10 log(PEP), or 50 dB, whichever is less stringent |

| Service category in accordance with Article S1, or equipment type (Note 15) | Attenuation (dB) below the power supplied to the antenna transmission line |
|---|---|
| Services operating below 30 MHz, except space, radiodetermination, broadcast, those using SSB from mobile stations, and amateur (Note 12) | 43 + 10 log(X), or 60 dBc, whichever is less stringent, where X = PEP for SSB modulation, and X = P for other modulation |
| Low-power device radio equipment (Note 13) | 56 + 10 log(P), or 40 dBc, whichever is less stringent |
| Emergency position-indicating radio beacon<br>Emergency locator transmitter<br>Personal location beacon<br>Search and rescue transponder<br>Ship emergency, lifeboat and survival craft transmitters<br>Land, aeronautical or maritime transmitters when used in emergency | No limit |

P: mean power in watts supplied to the antenna transmission line, in accordance with No. **S1.158**. When burst transmission is used, the mean power P and the mean power of any spurious emissions are measured using power averaging over the burst duration.

PEP: peak envelope power in watts supplied to the antenna transmission line, in accordance with No. **S1.157**.

dBc: decibels relative to the unmodulated carrier power of the emission. In the cases which do not have a carrier, for example in some digital modulation schemes where the carrier is not accessible for measurement, the reference level equivalent to dBc is decibels relative to the mean power P.

**Notes in Table II**

[10] Spurious emission limits for all space services is stated in a 4 kHz reference bandwidth.

[11] For analogue television transmissions, the mean power level is defined with a specified video signal modulation. This video signal has to be chosen in such a way that the maximum mean power level (e.g., at the video signal blanking level for negatively modulated television systems) is supplied to the antenna transmission line.

[12] All classes of emission using SSB are included in the category "SSB".

[13] Low-power radio devices having a maximum output power of less then 100 mW and intended for short-range communication or control purposes; such equipment is in general exempt from individual licensing.

[14] These values are "design objectives". This note will not be applicable after WRC-99.

[15] In some cases of digital modulation (including digital broadcasting), broadband systems, pulsed modulation and narrow-band high power transmitters for all categories of services, there may be difficulties in meeting limits close to ±250% of the necessary bandwidth.

APPENDIX S4

**Consolidated List and Tables of Characteristics for Use in the Application of the Procedures of Chapter SIII**

ANNEX 1A

(to Appendix S4)

**List of characteristics of stations in the terrestrial services[1]**

**SUP** *ITEM 6C – Experimental station*

Symbol EX in this item for experimental station only.

**ADD** *ITEM 7AA – Type of modulation*

The choice of modulation is needed in order to specify if the requirement is to use DSB, SSB or any new broadcasting techniques recommended by ITU-R.

**MOD** *ITEM 8B – Radiated power (dBW)*

The radiated power expressed in dBW in one of the forms described in Nos. **S1.161** to **S1.163**. In the case of systems where automatic power control is applied, indicate the range of power control, expressed in dB relative to the transmitted power indicated above.

[1] The Bureau shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences. Additional information on the items listed in this Annex together with an explanation of the symbols is to be found in the Preface to the International Frequency List.

**NOC** *ITEM 9E – Height of antenna*

Information on height above ground level, in metres.

**MOD** *ITEM 9EA – Altitude of site above sea level*

Information on the altitude of the site above mean sea level, in metres (for VHF sound broadcasting (BC) and VHF/UHF television broadcasting (BT) assignments, and for all terrestrial stations in the frequency bands above 1 GHz that are shared between space radiocommunication and terrestrial radiocommunication services).

**ADD** *ITEM 9R – Slew angle*

The slew angle represents the difference between the azimuth of maximum radiation and the direction of unslewed radiation.

**SUP** *ITEM 10C – Seasons and solar activity*

The season or month of the year and the level of solar activity, expressed by appropriate symbols.

**ADD** *ITEM 10CA – Start date*

Used in the case that the requirement starts after the start of the schedule.

**ADD** *ITEM 10CB – Stop date*

Used in the case that the requirement stops before the end of the schedule.

**ADD** *ITEM 10CC – Days of operation*

Used when the station does not transmit every day of the week.

**Table of characteristics to be submitted for stations in the terrestrial services *(cont.)***

| Notice type | AP1/A1 | | | | | AP1/B | | AP1/C | AP1/A2 | AP1/A4 | | AP1/A5 | AP1/A6 | AP1/A7 | AP2 | AP5 | AP1/A1 | Notice type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item No | AL, NL FR, OF | FC, FP FA, BC FB | FD, FG | FX | SM | AM, ML MA, MO | MS, OD SA | All, except BC | BC | BC | BT | BC | BT | BC | BC | FC | FC (Art. S11) | Item No. |
| 5F | X | • | • | | X | | | | | | | | | | | • | | 5F |
| 5G | + | + | + | + | + | | | | | | | | | | | + | + | 5G |
| 6A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | 6A |
| 6B | + | + | X | X | | X | X | + | | | | | | | | X | | 6B |
| | | | | | | | | | | | | | | | | | | |
| 7A | X | X | X | X | X | X | X | X | X | X[5] | X[5] | X[5] | X[5] | X | X | X | X | 7A |
| 7AA | | | | | | | | | | | | | | | X | | | 7AA |
| 7B | | | | X | | | | | X | | | | | X | | | | 7B |
| 7C1 | | | | | | | | | X[4] | | X | | X | | | | | 7C1 |
| 7C2 | | | | | | | | | | | X | | X | | | | | 7C2 |
| 7D | | | | | | | | | | | | X | | | | | | 7D |
| 7E | | | | +[7] | | | | | | | | | | | | | | 7E |
| 7F | | | | +[7] | | | | | | | | | | | | | | 7F |
| 8 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | 8 |
| 8A | • | • | X | • | X | • | • | • | X | | | | | X | X | X | • | 8A |
| 8AB | | | | +[7] | | | | | | | | | | | | | | 8AB |
| 8B | • | • | | • | | • | • | • | | X | X | X | X | | | | • | 8B |
| 8BH | | | | | | | | | | X | X | X | X | | | | | 8BH |
| 8BV | | | | | | | | | | X | X | X | X | | | | | 8BV |
| 8D | | | | | | | | | | | X | | X | | | | | 8D |
| 9 | X | X | X | X | X | | | | X | X | X | X | X | | X | X | X | 9 |
| 9A | X | X | X | X | X | | | | X | X | X | X | X | | X | X | X | 9A |
| 9AA | | | | | | | | | | | | | | X | | | | 9AA |
| 9AB | + | + | + | + | + | | | | + | | | | | | + | + | + | 9AB |
| 9B | | | | + | | | | | | | | | | | X | | | 9B |
| 9C | + | + | + | + | + | | | | | | | | | | | + | | 9C |
| 9CA | | | | | | | | | | | | | | X | | | | 9CA |
| 9D | | | | + | | | | | | X | X | X | X | | | | | 9D |
| 9E | + | + | + | + | + | | | | X | X | X | X | X | | | | | 9E |
| 9EA | + | + | + | + | + | | | | | X | X | X | X | | | | | 9EA |
| 9EB | | | | | | | | | | X | X | X | X | | | | | 9EB |
| 9EC | | | | | | | | | | X | X | X | X | | | | | 9EC |

X Mandatory  • One of the items  + Required in specific cases  O Optional

4) For low power channels.

5) May not be required with the new TerRaSys

7) This information need only to be furnished when such information has been used as a basis to effect coordination with another administration. This information may be optionally provided in a request for coordination under Nos. S9.16, S9.18 and S9.19.

**Table of characteristics to be submitted for stations in the terrestrial services *(cont.)***

| Notice type | AP1/A1 | | | | | AP1/B | | AP1/C | AP1/A2 | AP1/A4 | | AP1/A5 | AP1/A6 | AP1/A7 | AP2 | AP5 | AP1/A1 | Notice type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item No | AI, NI LR, OE | FC, FP FA, BC FB | FD, FG | FX | SM | AM, ML MA, MO | MS, OD SA | All, except BC | BC | BC | BT | BC | BT | BC | BC | FC | FC (Art. S11) | Item No |
| 9F | | | | | | | | | | | | | | X | | | | 9F |
| 9G | + | + | + | + | + | | | + | | | | | | | + | + | | 9G |
| 9GH | | | | | | | | | X | | | | | | | | | 9GH |
| 9GV | | | | | | | | | X | | | | | | | | | 9GV |
| 9H | | | | | | | | | X | X[5] | X[5] | X[5] | | + | | + | | 9H |
| 9I | | | | | | | | | X | | | | | X | | | | 9I |
| 9IA | | | | | | | | | | | | | | X | | | | 9IA |
| 9J | | | | +, +[7] | | | | | | | | | | | X | + | | 9J |
| 9K | | | | +[7] | | | | | | | | | | | | | | 9K |
| 9N | | | | | | | | | | | | X[5] | | | | | | 9N |
| 9NA | | | | | | | | | | | | | | X | | | | 9NA |
| 9NH | | | | | | | | | | X[6] | X[6] | X[6] | X | | | | | 9NH |
| 9NV | | | | | | | | | | X[6] | X[6] | X[6] | X | | | | | 9NV |
| 9O | | | | | | | | | | | | | | X | X | X | | 9O |
| 9P | | | | | | | | | | | | | | X | | | | 9P |
| 9Q | | | | | | | | | X | | | | | X | | | | 9Q |
| 9R | | | | | | | | | | | | | | | X | | | 9R |
| 9T1 | | | | | | | | | | | | | | X | | | | 9T1 |
| 9T2 | | | | | | | | | | | | | | X | | | | 9T2 |
| 9T3 | | | | | | | | | | | | | | X | | | | 9T3 |
| 9T4 | | | | | | | | | | | | | | X | | | | 9T4 |
| 9T5 | | | | | | | | | | | | | | X | | | | 9T5 |
| 9T6 | | | | | | | | | | | | | | X | | | | 9T6 |
| 9T7 | | | | | | | | | | | | | | X | | | | 9T7 |
| 9T8 | | | | | | | | | | | | | | X | | | | 9T8 |
| 9T9A | | | | | | | | | | | | | | + | | | | 9T9A |
| 9T9B | | | | | | | | | | | | | | X | | | | 9T9B |
| 9T9C | | | | | | | | | | | | | | + | | | | 9T9C |

X Mandatory • One of the items + Required in specific cases, O Optional

5) May not be required with the new TerRaSys.

6) To be used in the future TerRaSys.

7) This information need only to be furnished when such information has been used as a basis to effect coordination with another administration. This information may be optionally provided in a request for coordination under Nos. S9.16, S9.18 and S9.19

**Table of characteristics to be submitted for stations in the terrestrial services *(end)***

| Notice type | AP1/A1 | | | | | AP1/B | | AP1/C | AP1/A2 | AP1/A4 | | AP1/A5 | AP1/A6 | AP1/A7 | AP2 | AP5 | AP1/A1 | Notice type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item No | AL, NL LR, OE | FC, FP FA, BC FB | FD, FG | FX | SM | AM, ML MA, MO | MS, OD SA | All, except BC | BC | BC | BT | BC | BT | BC | BC | FC | FC (Art S11) | Item No |
| 9T9D | | | | | | | | | | | | | | + | | | | 9T9D |
| 10A | | | | + | | | | | | | | | | | | | | 10A |
| 10B | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | 10B |
| | | | | | | | | | | | | | | | | | | |
| 10CA | | | | | | | | | | | | | | | O | | | 10CA |
| 10CB | | | | | | | | | | | | | | | O | | | 10CB |
| 10CC | | | | | | | | | | | | | | | O | | | 10CC |
| 10D | | | | | | | | | | | | | | | | X | | 10D |
| 10E | | | | | | | | | | | | | | | | X | | 10E |
| 10F | | | | | | | | | | | | | | | | | X | 10F |
| 11 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | O | X | 11 |
| 12A | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | 12A |
| 12B | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | 12B |

X Mandatory  • One of the items  + Required in specific cases  O Optional

# ANNEX 1B

(to Appendix **S4**)

## Table of characteristics to be submitted for stations in the terrestrial services

| Notice type | AP1/A1 | | | | | AP1/B | | AP1/C | AP1/A2 | AP1/A4 | | AP1/A5 | AP1/A6 | AP1/A7 | AP2 | AP5 | AP1/A1 | Notice type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item No | AL, NL, LR, OE | FC, FP FA, BC FB | FD, FG | FX | SM | AM, ML, MA, MO | MS, OD SA | All, except BC | BC | BC | BT | BC | BT | BC | BC | FC | FC (Art. S11) | Item No. |
| B | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | B |
| SYNC | | | | | | | | | X | | | | | X | | | | SYNC |
| 1A | X | X | X | X | X | X | X | X | X | X | X[5] | X | X[5] | X | X | | X | 1A |
| 1B | + | + | + | + | + | + | + | + | | | X[5] | | | | + | | | 1B |
| 1C | | | | + | | | | | | | | | | | X | + | | 1C |
| 1D | | | | | | | | | | | X | | X | | | | | 1D |
| 1E | | | | | | | | | | | X | | X | | | | | 1E |
| 1G | | | | | | | | | | | | | | | O | | | 1G |
| 1H | | | | | | | | | | | | | | | X | | | 1H |
| 1X | | | | | | | | | | | | | | | | X | | 1X |
| 1Y | | | | | | | | | | | | | | | | O | | 1Y |
| 1Z | | | | | | | | | | | | | | | | + | | 1Z |
| 2C | X | X | X | X | X | X | X | X | X | X | X | X | X | X | + | X | X | 2C |
| 3A | X | X | X | X | X | | | | X | O | O | O | O | | X | | X | 3A |
| 4A | X | X | X | X | X | | | | X | X | X | X | X | X | X | + | X | 4A |
| 4B | X | X | X | X | X | | | X | X | X | X | X | X | X | X | X | X | 4B |
| 4C | X | X | X | X | X | •1) | •1) | •1) | X | X | X | X | X | X | X | + | X | 4C |
| 4D | | | | | | •1) | •1) | •1) | | | | | | | | | | 4D |
| 4E | | | | | | • | • | • | | | | | | | | | | 4E |
| 4F | | | | | | | | | | | | | | | | | X | 4F |
| 4G | | | | | | | | | X | | | | | | | | | 4G |
| 5A | | | | X | | X | X | | | | | | | | | | | 5A |
| 5B | | | | X | | X | X | | | | | | | | | | | 5B |
| 5C | | | | X | | X | X | | | | | | | | | | • | 5C |
| 5D | | •2) | •2) | | | | | | | | | | | | X | •3) | • | 5D |
| 5E | X | • | • | | X | | | | | | | | | | | • | | 5E |

X Mandatory  • One of the items  + Required in specific cases  O Optional

1) (4C and 4D) or (4E).
2) (5D) or (5E and 5F).
3) (5D and 5F) or (5E and 5F).
5) May not be required with the new TerRaSys.

APPENDIX S4

ANNEX 2A

(to Appendix **S4**)

**Characteristics of Satellite Networks or Earth or Radio Astronomy Stations**[1]

**ADD** **A.13 As appropriate, reference to the Special Section of the Bureau's Weekly Circular**

**ADD** a) providing the advance publication information required in accordance with No. **S9.1**;

**ADD** b) providing the coordination information required in accordance with No. **S9.7**;

**ADD** c) providing the information required in accordance with No. **S9.21**;

**ADD** d) providing the coordination information required in accordance with No. **S9.8**;

**ADD** e) providing the coordination information required in accordance with No. **S9.9**;

**ADD** f) providing the coordination information required in accordance with No. **S9.11**;

**ADD** g) providing the coordination information required in accordance with No. **S9.11A**;

**ADD** h) providing the information required in accordance with Article 6 of Appendix **S30B**.

...

**B.4 Non-geostationary space station antenna characteristics**

*a)* Isotropic gain of the antenna in the direction of maximum radiation (dBi) and the antenna radiation pattern.

*b)* In the case of a space station submitted in accordance with Resolution **46 (Rev.WRC-95)**/ No. **S9.11A**:

- orientation of the satellite transmitting and receiving antenna beams and their radiation pattern;
- satellite antenna gain $G(\theta_e)$ as a function of elevation angle at a fixed point on the Earth;
- spreading loss (for a non-GSO satellite) as a function of elevation angle (to be determined by equations or provided in graphical format);
- maximum and average beam peak e.i.r.p./4 kHz and e.i.r.p./1 MHz for each beam;
- for the fixed-satellite service (space-to-Earth) in the band 6 700 - 7 075 MHz, calculated peak value of power flux-density produced within ±5 degrees inclination of the geostationary-satellite orbit.

APPENDIX S4

## Consolidated List and Tables of Characteristics for Use in the Application of the Procedures of Chapter SIII

ANNEX 2B (TO APPENDIX S4)

### Table of characteristics to be submitted for space and radio astronomy services

### A. General characteristics of the satellite network or the earth station

| Items in Appendix | Advance publication of a geostationary-satellite network | Advance publication of a non-geostationary satellite network subject to coordination under Section II of Article S9 | Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9 | Notification or coordination of a GSO network (including Appendix S30B) | Notification or coordination of a non-geostationary-satellite network | Notification or coordination of an earth station | Notice for space stations in the BSS under Appendix S30 * | Notice for feeder-link stations under Appendix S30A * | Notice for stations in the FSS under Appendix S30B | Items in Appendix | Radio-astronomy |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A.1.a | X | X | X | X | X | | X | X | X | A.1.a | |
| A.1.b | | | | | | | X | | | A.1.b | |
| A.1.c | | | | | | | | X | | A.1.c | |
| A.1.d | | | | | | | | | X | A.1.d | |
| A.1.e.1 | | | | | | X | | | | A.1.e.1 | |
| A.1.e.2 | | | | | | X | | | | A.1.e.2 | X |
| A.1.e.3 | | | | | | X | | | | A.1.e.3 | |
| A.1.e.4 | | | | | | | | | | A.1.e.4 | X |
| A.1.f | X | X | X | X | X | X | X | X | X | A.1.f | X |
| A.2.a | X | X | X | X | X | X | X | X | X | A.2.a | |
| A.2.b | X | | | X | | | | | | A.2.b | |
| A.2.c | | | | | | | | | | A.2.c | X |
| A.3 | | | X | X | X | X | X | X | | A.3 | X |
| A.4.a.1 | X | | | X | | | X | X | X | A.4.a.1 | |
| A.4.a.2 | | | | X | | | X | X | | A.4.a.2 | |
| A.4.a.3 | | | | X | | | | | | A.4.a.3 | |
| A.4.a.4 | | | | X | | | | | | A.4.a.4 | |
| A.4.a.5 | | | | X | | | | | | A.4.a.5 | |
| | | | | | | | | | | | |
| A.4.b.1 | | X | X | | X | | | | | A.4.b.1 | |
| A.4.b.2 | | X | X | | X | | | | | A.4.b.2 | |
| A.4.b.3 | | X | X | | X | | | | | A.4.b.3 | |
| A.4.b.4 | | X | X | | X | | | | | A.4.b.4 | |
| A.4.b.5 | | | | | X | | | | | A.4.b.5 | |
| A.4.c | | | | | | X | | | | A.4.c | |
| A.5 | | | | X | X | X | X | X | X | A.5 | |

X Mandatory information  O Optional information  C This information need only be furnished when it has been used as a basis to effect coordination with another administration

* The application of this column is suspended pending the decision of WRC-99.

| Items in Appendix | Advance publication of a geostationary-satellite network | Advance publication of a non-geostationary satellite network subject to coordination under Section II of Article S9 | Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9 | Notification or coordination of a GSO network (including Appendix S30B) | Notification or coordination of a non-geostationary-satellite network | Notification or coordination of an earth station | Notice for space stations in the BSS under Appendix S30 * | Notice for feeder-link stations under Appendix S30A * | Notice for stations in the FSS under Appendix S30B | Items in Appendix | Radio-astronomy |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A.6 | | | | X | X | X | X | X | X | A.6 | |
| A.7.a | | | | | | X | | X | | A.7.a | |
| A.7.b | | | | | | X | | X | | A.7.b | |
| A.7.c | | | | | | X | | | | A.7.c | |
| A.7.d | | | | | | X | | X | | A.7.d | |
| A.8 | | | | | | | X | | | A.8 | |
| A.9 | | | | | | | X | | | A.9 | |
| A.10 | | | | | | X | | | | A.10 | |
| A.11 | | | | | | | X | X | | A.11 | |
| A.12 | | | | | | | | X | | A.12 | |
| A.13 | | | | X | X | | | | | A.13 | |

## B. Characteristics to be provided for each satellite antenna beam and for each earth station antenna

| Items in Appendix | Advance publication of a geostationary-satellite network | Advance publication of a non-geostationary satellite network subject to coordination under Section II of Article S9 | Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9 | Notification or coordination of a GSO network (including Appendix S30B) | Notification or coordination of a non-geostationary-satellite network | Notification or coordination of an earth station | Notice for space stations in the BSS under Appendix S30 * | Notice for feeder-link stations under Appendix S30A * | Notice for stations in the FSS under Appendix S30B | Items in Appendix | Radio-astronomy |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B.1 | | | X | X | X | X | X | X | X | B.1 | |
| B.2 | | | X | X | X | X | | | X | B.2 | |
| B.3.a | | | | X | | | | | | B.3.a | |
| B.3.b.1 | | | | X | | | | | | B.3.b.1 | |
| B.3.b.2 | | | | X | | | | | | B.3.b.2 | |
| B.3.c | | | | C | | | | | | B.3.c | |
| B.3.d | | | | X | | | X | X | X | B.3.d | |
| B.3.e | | | | X | | | | | | B.3.e | |
| B.3.f | | | | X | | | | X | | B.3.f | |
| B.3.g.1 | | | | | | | X | X | X | B.3.g.1 | |
| B.3.g.2 | | | | | | | X | X | X | B.3.g.2 | |
| B.3.g.3 | | | | | | | X | X | X[9] | B.3.g.3 | |
| B.3.g.4 | | | | | | | X | X | X[9] | B.3.g.4 | |
| B.3.g.5 | | | | | | | X | X | X[9] | B.3.g.5 | |
| B.3.g.6 | | | | | | | | X | | B.3.g.6 | |
| B.3.g.7 | | | | | | | X | | | B.3.g.7 | |
| B.4.a | | | X | | X | | | | | B.4.a | |
| B.4.b | | | X | | X | | | | | B.4.b | |
| B.5.a | | | | | | X | | | | B.5.a | |
| B.5.b | | | | | | X | | | | B.5.b | |
| B.5.c | | | | | | X | | | | B.5.c | |
| B.6 | | | | | | | | | | B.6 | X |

X Mandatory information  O Optional information  C This information need only be furnished when it has been used as a basis to effect coordination with another administration

[9] Only information on co-polar antenna characteristics is required

* The application of this column is suspended pending the decision of WRC-99

## C. Characteristics to be provided for each group of frequency assignments for a satellite antenna beam or an earth station antenna

| Items in Appendix | Advance publication of a geostationary-satellite network | Advance publication of a non-geostationary satellite network subject to coordination under Section II of Article S9 | Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9 | Notification or coordination of a GSO network (including Appendix S30B) | Notification or coordination of a non-geostationary-satellite network | Notification or coordination of an earth station | Notice for space stations in the BSS under Appendix S30 * | Notice for feeder-link stations under Appendix S30A * | Notice for stations in the FSS under Appendix S30B | Items in Appendix | Radio-astronomy |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C.1 | X | X | X | | | | | | X | C.1 | |
| C.2.a | | | | X | X | X | X | X | | C.2.a | |
| C.2.b | | | | | | | | | | C.2.b | X |
| C.3.a | | | | X | X | X | | X | | C.3.a | |
| C.3.b | | | | | | | | | | C.3.b | X |
| C.4 | X | X | X | X | X | X | X | X | | C.4 | X |
| C.5.a | | | X | X | X | | | X | X | C.5.a | |
| C.5.b | | | | | | X | | | | C.5.b | |
| C.5.c | | | | | | | | | | C.5.c | X |
| C.6 | | | X | X | X | X | X | X | | C.6 | |
| C.7.a | | | O | X | X | X | X | X | | C.7.a | |
| C.7.b | | | O | C | C | C | | | | C.7.b | |
| C.7.c | | | O | C | C | C | | | | C.7.c | |
| C.7.d | | | O | C | C | C | | | | C.7.d | |
| C.8.a | | | X[1), 7)] | X[7)] | X[7)] | C[8)] | | | | C.8.a | |
| C.8.b | | | X[1), 7)] | X[7)] | X[7)] | X | | | | C.8.b | |
| C.8.c | | | O | X[6)] | X[6)] | X[6)] | | | | C.8.c | |
| C.8.d | | | | X[7)] | X[7)] | | | | | C.8.d | |
| C.8.e | | | O | X[6)] | X[6)] | X[6)] | | | | C.8.e | |
| C.8.f | | | X[7)] | | | | | | | C.8.f | |
| C.8.g | | | | C[3)] | C[3)] | C[4), 7)] | | | | C.8.g | |
| C.8.h | | | | | | | X | | | C.8.h | |
| C.8.i | | | | | | | | X | | C.8.i | |
| C.8.j | | | | | | | | | X | C.8.j | |

X Mandatory information  O Optional information  C This information need only be furnished when it has been used as a basis to effect coordination with another administration

1) Only the value of maximum power density is mandatory.

2) For transmission from the space station only.

3) For space-to-space relay only.

4) For transmission from the earth station only.

5) Not required for coordination under No. S9.15, S9.17 or S9.17A.

6) Required, if applicable, for the type of transmission. If not applicable, a reason why it is not applicable is required.

7) One or the other of C.8.a or C.8.b is mandatory, but not both.

8) Only the value of total peak envelope power is required for coordination under No. S9.15, S9.17 or S9.17A.

* The application of this column is suspended pending the decision of WRC-99.